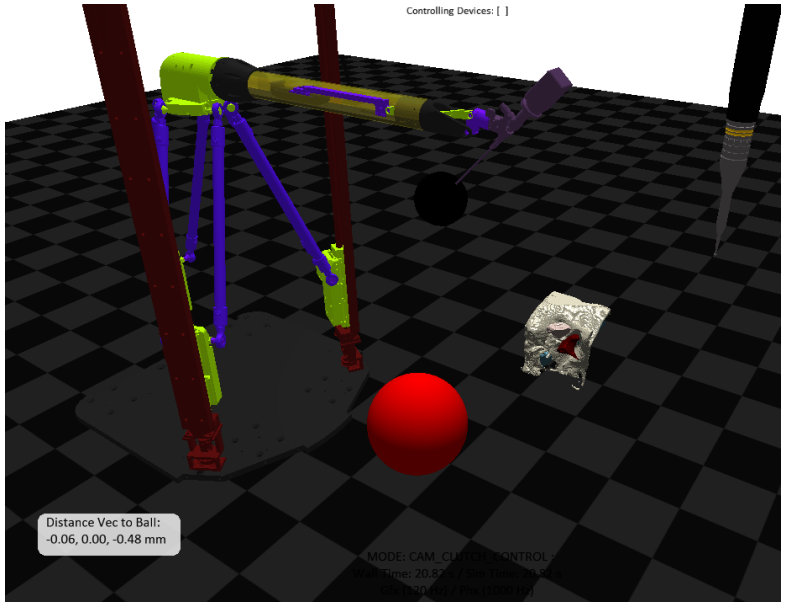
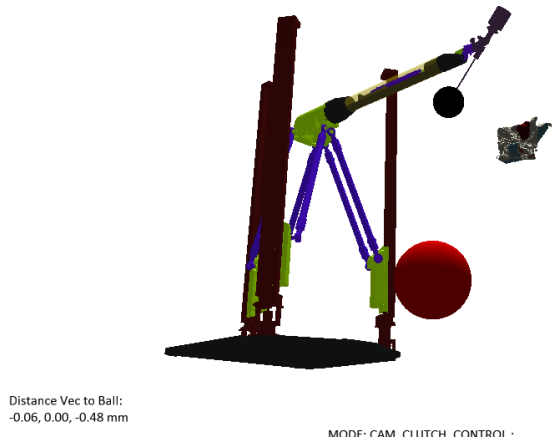
Friday Update 03-11-2022

Tommy Liang, Mike Fan, Jintan Zhang

Simulator Updates

- Issues:
  - Galen model STL files is off-scale
  - Order of ADF loading
- Updates:
  - Pipeline seems to work correctly, wrong numbers due to scaling
  - Swapping drill + rack with the 35-degree endoscope mesh





System Updates

- We have combined all pieces of the system, both directions working.
- Force calculation appears to be correct based on readings.
- More testing needs to be done, but Galen is experiencing issues at the moment.

Payload: Distance vector from TOOL TIP to closest voxel on virtual surface d

1. Force applied to tool tip

$d = (x, y, z, 0\ 0\ 0)$

If $||d|| > \alpha$, $d = (0, 0, 0, 0, 0, 0)$ where α is a maximum

$F_{s\_tip} = (1/||d||)*kp*(\text{normalized}(d)) +$ [possible kd term] <- this is in robot frame

$F_{s\_ee} = Ad^{T}_{tip\_ee} * F_{s\_tip}$

2. Resolve Force Vector at End Effector and Sum

$F_{total} = w_1*F_{s\_ee} + w_2*F_{handle}$

W1 and w2 are adjustable weights

3. F_{total} get shipped to the optimizer

Next Steps

- Test combined system
- Draft an IRB and send draft to Pete

Galen Side Update